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CONFERENCE ON GOVERNANCE OF WATERSHEDS IN THE PHILIPPINES: CHALLENGES AND CONSTRAINTS

(SUMMARY OF PROCEEDINGS)

IMPERIAL SUITES
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Annexes

Conference on Governance of Watersheds in the Philippines: Challenges and Constraints*

I. Presentations, Reactions

Paper No. 1: **Status and Challenges in the Governance of Watersheds**

By: Dr. Rex Cruz,
College of Forestry, University of the Philippine, Los Banos

Some key points

- Said that proclamation of watershed is non-participatory or highly prescriptive, biased towards protection and inconsistent with sustainable development.
- Cited how government regulations hinder stakeholders' participation and pointed out that management of watersheds seems to be high in investment and low in returns, which discourages involvement of major stakeholders.
- Expressed the need to further empower key stakeholders (local government units or LGUs, civil society groups, research and technology development groups) for improved governance of watersheds.

Summary of Reaction to Paper No.1

By: Dr. Ben S. Malayang
Senior Policy Specialist, EcoGovernance Project

- Pointed out that upland watershed development may not be the only way for better land productivity.
- Presented data that good water stocks have gone up, and that from 1995-2001, water irrigation has actually increased. This was largely due to plantations or man-made forests.
- Also pointed out that watersheds were largely dependent on policies resulting in proclamations.
- Different governing bodies which issue policies have varying interests, thus they may have to contend with each other to achieve their individual goals.

* Co-sponsored by the Department of Environment and Natural Resources' Philippine Environmental Governance Project and the Watershed Resources Development Program, the Integrated Water Resources Alliance, the United States Agency for International Development and the World Bank

Paper No. 2: **Lessons from a Review of the Kaliwa and Maragang Pilot Watershed Management Projects**
Implications for the Operationalization of the Philippine Strategy for Improved Watershed Resources Management
By: Malcolm Douglas
Consultant, World Bank WRDP-WMIC

Some key points

- Proposed that better community involvement be encouraged, formalizing people's participation from the very beginning and not just during the end of the project. This creates a sense of trust, which was lacking in the traditional top-to-bottom planning approach.
- Suggested better research and development, as well as better IEC involvement, even re-training government staff to better reach project intended project beneficiaries.
- Pointed out that the downstream beneficiaries should contribute to upstream management.

Summary of Reaction to Paper No. 2
By: Atty. Edward Lorenzo
Tanggol Kalikasan

Some of the points raised:

- There is a large chance that funds (intended for watershed management) may be subject to graft and corruption.
- Communities are wary of getting involved in such large-scale activities, particularly where the government is involved, despite efforts to motivate them.
- There is a belief that DENR develops watershed projects because it has to meet a certain development quota and has no real interest in their maintenance or performance.
- There is a lack of resources in implementing such a holistic approach to fostering community involvement.

Paper No. 3: **DENR-LGU-Community Partnership in the Management of Forests: The Case of Wao, Lanao del Sur**
By: Atty. Roberto Oliva
Policy Specialist, EcoGovernance Project

Some key points

- Cited different instances wherein the people of Wao, with minimal DENR involvement, took the initiative to work together to improve their local watershed.
- Emphasized that simple activities can make a difference as he pointed out that regularly holding even small meetings involving everyone—from the local and national levels—could lead to better understanding of issues such as need for Forest Land Use Plan.
- Stressed that DENR cannot do it alone, that greater LGU participation is needed.

Summary of Reaction to Paper No. 3:
Mr. Virgilio Tiongson,
Provincial Administrator, Nueva Vizcaya

- Pointed out that studies on devolution in the sectors of health management and in agriculture cannot be compared to watershed management because they involve different behaviors.
- Despite initial reservations, he eventually expressed his agreement with Atty. Oliva that devolution did not fully work in many parts of the country, particularly in shifting management of watersheds to LGUs.
- This is mainly because LGUs are reluctant to engage in such things as forestry or land management. They cannot take the lead as they lack technical experience. Their sole expertise lies in managing people.
- He also raised the issue of possible conflict in the complete devolution of watershed management to LGUs, stating that officials of the DENR may not be willing to report to LGUs.

Paper No. 4: The Requirements for the Institution of a User Fee System in a Watershed Context
By: Dr. Germelino M. Bautista
Institute of Philippine Culture, Ateneo de Manila University

- Proposed the establishment of a user fee system to create a reporting and monitoring system and set up a fund that can be used to finance the operational as well as developmental needs of a watershed.
- Presented some problems that may hinder the establishment of a user fee system:

  - The absence of a paying market;
  - Free-riders of open access resources (where people do not want to pay for resources they can get for free); and
  - The lack of tenure instruments (presents legal problems in creating specific parameters in the user fee system).

Summary of Reaction to Paper No. 4:
Mr. Felix Mirasol
Protect Area Superintendent, Mt. Kitanglad

- Detailed how a MOA between a Management Board—established solely to manage the watershed—and several agricultural businesses was signed (Neighboring plantations, vegetable growers, poultry and piggery growers all agreed to pay a concession fee in exchange for water services. In this case, ₱200/ha/year.)
- Stated that fees were also collected from the eco-tours provided within the watershed area as well as land rental and funds from LGUs.
- The ideal conditions that enabled the success of the system resulted mainly from the joint cooperation of the Protected Area Management Board and information provided by ENRAP studies as well as unwavering LGU commitment.

- He also pointed out that the key beneficiaries of the fees were the major players/ stakeholders, most of which were members of the local community.
- Also noted some of the problems still encountered in the system:

  - What rules to follow (those of the LGU's, the DENR's, or the management board's?)
  - Deciding who is ultimately accountable for the watershed (the people who maintain it, the LGU, or the DENR?)

Paper No. 5: Mobilizing a Multi-sector Group for Watershed Management: The Iloilo Watershed Initiative

By: Jessica C. Salas
President, Philippine Watershed Management Coalition

Some key points

- Cited how a multi-level/multi-sector management group can effectively overcome the problems concerning socio-economic and conflicting policies.
- Stressed the value of good governance: clarifying which governing body is in authority, empowering the LGUs to make the rules and improved community awareness through continuing education.
- Showed the interaction between the upstream and downstream people, highlighting several problems on both sides and stating that continuous communication between the two will help them solve watershed management problems.

Summary of Reaction to Paper No. 5

Mr. Elmer Mercado
Advocacy and Coalition Building Specialist, EcoGov

- Elaborated on how government intervention hinders the success of a watershed project, both in the upstream and downstream level.
- Provided examples on overlapping DENR mandates, population issues, onsite versus area-wide management, and the politics involved not just with the government, but between the lowland and upland settlers.
- Pointed out that how you implement is not as important as the process of implementation itself, stressing that constant planning due to the conflicting interests of the government and various shareholders serves as a major impediment to the success of a project.
- Presented the importance of management at the grassroots level, how the government should keep in mind the needs of the people living on-site, instead of troubleshooting by simply creating policies to meet people's needs.

Paper No. 6: **The Integrated Water Resources Alliances (IWRA) Experience and Lessons Learned in the Philippines**

By: Atty. Gil-Fernando C. Cruz
Executive Director, League of Cities of the Philippines

Some key points

- Pointed out that the Integrated Watershed Management Resources Alliances (IWRA) is an innovative approach to water resource management as it adopts an inclusive and participatory process that engages economic interests in urban, industrial, agricultural and tourism sectors, focusing mainly on the needs of the poor.
- The basic foundation of the IWRA project is to form an alliance between municipalities that surround a watershed, providing a forum in which to discuss issues and conduct planning.
- Cited the use of a massive survey collected from the communities within their municipalities to be able to come up with an accurate assessment of the issues existing in their watershed program.

(Note: No rector for this paper)

II. Some issues raised

- It was proposed that mission teams be tapped for better monitoring of watershed management and also maximize use of the DENR technical staff stationed in the regions.

- The issue of having just one set of policies applicable to watersheds was raised. This was rebutted with the logic that some rules were dependent on jurisdiction and ownership.

- A more flexible set of rules for managing watersheds was suggested. The traditional regulations were said to be flawed, and that certain rules that came with proclamation actually hampered the success of managing watersheds in general.

- The question on who is ultimately accountable for managing watersheds should be determined once and for all. Participants were reminded, however, that the accountability on a co-managed watershed is clearly specified in the DENR-DILG Joint Memorandum Circular (JMC) 98-01, which was strengthened by JMC 2003-01.

- More incentives should be offered to local communities for them to get actively involved in watershed management. One proposal was to offer them employment.

- The DENR is playing—and should continue to play—an active role in managing watersheds.

- It was pointed out that the water districts are mandated to pay for the management of watersheds, as in the case of the Maasin watershed.

- The best people to manage the watershed are the ones living near it, with DENR available to monitor their progress. It was suggested that the locals living near the watershed be deputized to enforce the rules established by the watershed officials.

- It was pointed out that it is not altogether impossible for different agencies or stakeholders to work together and co-manage a watershed. Using the case of Wao, it showed that even simple but regular meetings between and among major stakeholders can clear the air of animosity and promote camaraderie, towards a better working environment for both LGUs and the DENR. The lesson? Little things can make a difference.

III. Major recommendations

1. **Review and harmonize policies (with respect to NIPAS Law, IPRA Law, Local Government Code, Mining Law, Executive Order No. 192)**

   - Several policies on protection of forest lands conflict with existing regulations that were designed to protect watersheds.

   - The long list of requirements needed to proclaim watersheds create procedural backlog; thus, delaying proper actions that have to be taken immediately to protect watersheds.

2. **Clarify policy on planted trees within watershed reservation**

   - Clarification on whether planted tress in watersheds could be harvested.

   - What incentives should be given to stakeholders of watersheds in developing forest plantations?

3. **Clearly identify responsibility/accountability for management of watersheds covered by two or more LGUs**

   - Policies should specify the roles of LGUs and DENR in co-managing watersheds covered by several LGUs.

   - Policies should also specify the responsibilities of LGUs which benefit from watersheds located in, and managed by, another LGU.

4. **Enhance LGUs' authority and capability to manage watersheds**

   - E.O. 192 states that the DENR shall have sole authority when it comes to the management of forest land and natural resources. Several other policies (JMC 98-01, and recently JMC 23-01) have made co-management of watersheds possible, although matters regarding authority are still vague.

     - In a co-management arrangement, who should really be in charge?
     - Should a regional official of the DENR be answerable to LGUs and local stakeholders regarding the protection and management of forests and forests lands?

   - It was also mentioned that responsibilities were often devolved to LGUs even before they were ready, rendering them ineffective in managing watersheds or similar projects.

   - Although LGUs are willing, they lack the technical knowledge, the manpower and the funds needed to effectively manage a watershed.

- It is clear that the DENR shall provide the technical assistance to the LGUs, but as to who should fund training activities, personnel and other logistical requirements are still unclear.

- It was suggested that LGUs provide the funding, while the DENR would provide the expertise. But it was pointed out that devolution only gave LGUs more things to do without providing the needed funds to do them.

5. Review the water permit issuance system of the National Water Resource Board (NWRB).

- Efforts should be made in decentralizing the issuance of water permits.

  - It would be easier if institutions could file their applications for water permits within their own region or provinces, instead of going to Metro Manila to do so.

- Procedures on where to get a water permit are confusing.

  - It was reported that the NWRB, the institution tasked to issue water permits, refers inquiries about the issuance of water permits in watersheds to the Land Management Bureau (LMB) since watersheds are still considered public lands. Yet inquiries about the same made to the LMB are referred back to the NWRB, since LMB does not handle issuance of water permits.

6. Pursue claims for LGUs' share in the national wealth

- LGUs should pursue their rightful claim for their share in the fees paid by entities using watershed resources (water supply, hydro-electric, etc.) that are within an LGU's jurisdiction (such as water utilities, power generators). Use share for watershed rehabilitation, protection and management.

7. Water Pricing Study

- A water pricing study should be conducted to decide how much have to be charged for water services.

  - What standards should be used in formulating the rates? Should "richer" clients subsidize the rates of "poorer" customers? Should those who pay more get better services? Etc.

Annexes

Status and Challenges in the Governance of Watersheds

Dr. Rex Cruz
College of Forestry, University of the Philippines-Los Banos

Presidential Decree No. 705 defines a *watershed reservation* as one proclaimed to improve or protect water yield and to reduce sedimentation, which means its primary purpose is to protect the watershed to deliver water for different uses.

Critical watersheds refer to those which support existing or proposed infrastructure such as hydro-power electric plants, irrigation facilities and water supply systems that need immediate protection and rehabilitation. No exploitation is allowed in these areas.

Priority watersheds, on the other hand, are identified on the basis of six criteria: contains important natural habitat; has high cultural and historical value; contributes to economy; contributes to livelihood of poor people; used for energy, irrigation and water supply systems; and carries risk of damages from flood and erosion.

Proclaimed watersheds

Records from the Department of Environment and Natural Resources (DENR) show that there are 154 identified as priority watersheds (with an area of about 12.5 million ha) in the country. Of these, 125 are proclaimed watersheds, covering 1.5 million ha of forest lands (see Table 1).

Table 1

Region	Forestland (ha)	% Forest Cover	Proclaimed Watersheds		Priority Watersheds	
			no.	ha	no.	ha
CAR	1,479,269		6	113,009	12	1,573,700
1	473,097		10	6,167	8	797,812
2	1,717,793	33	5	119,261	16	1,637,887
3	771,174	11	8	221,385	10	3,004,161
NCR	15,368				3	63,600
4	2,519,550	38	35	107,400	11	542,040
5	541,189	2	11	37,725	14	192,402
6	613,529	3	9	131,777	11	994,684
7	535,919	1	7	104,381	13	520,628
8	1,119,454	13	9	30,599	6	114,382
9	837,454		4.0	11,456	10	73,970
10	746,193		4.0	114,970	11	693,522
11	1,634,235		6.0	111,337	21	1,760,445
12	890,446		2.0	169,272	3	184,074
13	1,342,250		7.0	38,241	5	278,087
ARMM	618,002	19	2.0	182,354		
Philippines	14,375,653	18	125.0	1,499,334	154	12,431,394

Based on this table, some regions, like Regions 2 and 4, still have relatively larger portions of forest cover (more than 30 percent).

Looking at proclaimed watersheds (see Table 2), one finds that there are 35 watershed reservations – covering an area of 64,000 ha—proclaimed for domestic water purposes. There are also 35 watersheds, covering 400,000 ha, proclaimed for irrigation purposes; while there is one watershed, with an area of 180,000 ha, meant for generating hydroelectric power.

Table 2

Purpose of Proclamation	Number	Area (ha)	%
Domestic Water	35	64,521	5
Irrigation	35	396,104	29
Hydroelectric Power	1	180,460	13
Multiple Use	35	688,600	50
Others	15	53,355	4
Total	121	1,383,040	100

Effective watershed management

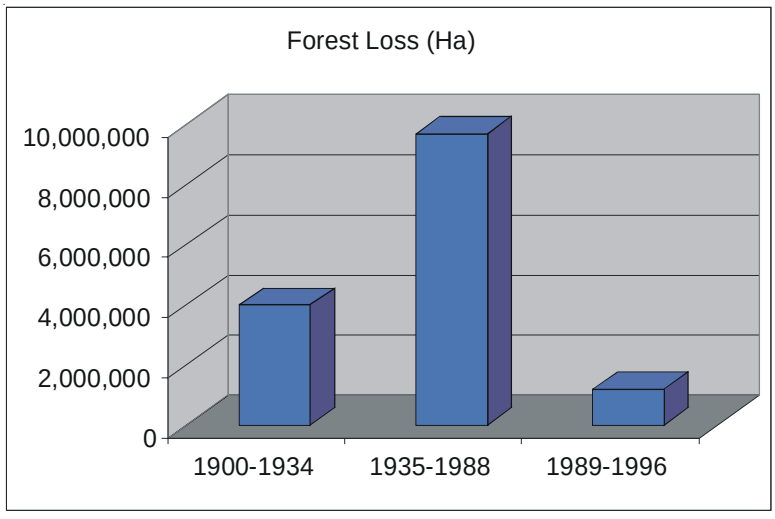
What is effective watershed management? Is it only placing watersheds under any form of governance, such as the 714,000 ha of critical watersheds under the government owned and controlled corporations (e.g., National Irrigation Authority, Local Waterworks Utilities Administration)? Or putting them under Community-based Forest Management (CBFM) agreements? Or does effective management mean being able to realize the purposes of the proclamation (i.e., improve, protect water yield; reduce sedimentation; good forest cover).

What we have in many of our forest management plans are areas that are more or less relevant to production forest. But CBFM is not limited to production forest; it is also found in protection forest, where we can say some of them are proclaimed watershed.

Again, which watersheds are under effective management? Does it mean placing watersheds under any form of governance?

Lets look some figures to relate to this.

Fig. 1



We see that our forest cover is dwindling. Between 1935 and 1988, we've lost so much forest. Up to now, we continue to lose our forests and I think DENR is (trying to) get an estimate on this.

A table I've shown a while ago shows the estimate of remaining forest cover by region. Let's look at some figures. From NIA, they have a lot of national irrigation systems around the country. And according to them there are a number of critical watersheds, in their perspective, in relation to the function of watersheds to deliver water for irrigation.

Table 3

Region	Forestland	A & D	Forests (ha)	Forest (% of Forest land)	Forest (% of Total Area)
1	473,097	810,922	396,400		
CAR	1,479,269	350,099			
2	1,717,793	965,965	1,501,443	52.0	32.7
3	771,174	1,051,908	194,500	25.2	10.7
NCR	15,368	48,232			
4	2,519,550	2,172,866	970,583	38.5	38.3
5	541,189	1,222,060	41,800	7.7	2.4
6	613,529	1,408,782	57,000	9.3	2.8
7	535,919	959,223	19,000	3.5	1.3
8	1,119,454	1,023,715	275,800	24.6	12.9
9	837,454	762,280	163,606	19.5	
10	746,193	657,100	793,039	106.3	
11	1,634,235	1,079,824	704,790	43.1	
12	890,446	546,828	273,756		
13	1,342,250	542,447			
ARMM	618,002	542,827		31.9	19.0
Philippines	15,854,922	14,145,078	5,391,717	34.0	18.0

It is shown here (Table 3), that there's still about 50 percent forest cover in Region 2. Summarizing this figure, I can show some specific information, such as the watershed in Bicol where we have an ongoing project now. Let's see some profile of the Waras-lalo Watershed. What we see here (table below) is the remaining forest cover, [which] is about 6 percent.

Table 4

Table 6.1 Land use/vegetation (ha) in Waras-Lalo Watershed.						
VEGETATIVE COVER	BAAO	BUHI	IRIGA CITY	NABUA	Total	% of Total
Open Canopy, mature trees covering <50%		2033			2033	6
Arable land, crops mainly cereals & sugar	2622	1955	1756	2881	9214	27
Cropland with coconut plantation	2971	2275	7290		12535	37
Cultivated area with brush/grassland		6805	1263		8068	24
Grassland, grass covering >70%			93		93	0
Lake		1618			1618	5
Marsh	74				74	0
Built-up Area	57	51	174	54	337	1
Grand Total	5724	14737	10575	2935	33972	100

And if you look at this table, the agricultural lands comprise close to 90 percent of the land area and most of these are found upland.

The Quinali River Watershed — this one-is really the worst — only has 1 percent forest cover remaining and the upland agricultural level is about 60 percent. Again, you see here the high dependence on upland resources.

These watersheds suffer from high dependency on agriculture, unstable agriculture, erosive land use and practices, high demand for agricultural expansion and limited alternative sources of income

Other watersheds

Let's move on to those watersheds with large forest lands. The Kaliwa Watershed, a site of the Watershed Resources Development Program (WRDP) and one of the watershed sources of domestic water for Metro Manila, the remaining forest cover is close to 50 percent; agricultural area is 21 percent.

Another is the Maranding Watershed is in Lanao Del Norte whose percentage of forest cover is about 27. This is the second largest watershed in Lanao. This is very critical because it supports main lowland agricultural area in Lanao, mainly that in the municipality of Kapatagan which has the greatest concentration of rice fields. Therefore, you can say [that] in the management of this [particular] watershed, those in the lowland, especially Kapatagan, will be very much interested in the management of the entire watershed.

Another watershed is Liangan, also in Lanao del Norte, which has about 48 percent forest cover and it's being tapped for its potential in hydropower-electric generating capacity. And then in Samar, we have relatively high forest cover: about 30 percent in Basay and more than 50 percent each in Can-avid and in Sulat Watershed.

These watersheds have something in common: they have productive agricultural land and they have a larger per capita resource base, less than five persons compared to others. As for non-timber based alternative sources of income they have trading, fishing, employment. There are also illegal extractions/conversions and slow but perceptible deforestation.

Trend

The trend is: Low Pop + Broad Resource Base + More Alternative Livelihood + Steward = Good Forest;
High Pop + Narrow Resource Base + Limited Livelihood + Steward = Poor Forest .

As for the problems in proclamation, why is it that other watersheds fail? It is because proclamation is non-participatory or highly prescriptive, biased towards protection and inconsistent with sustainable development. Further, proclamation isolates watershed development from other sectors. The problems with proclamation include: high investment, low return, thus, motivation to participate is low. Stumbling blocks include private rights, prior rights; ancestral claims; NIPAS Law.

Challenges and needs

Plan, plan, plan (such as forest land use plan) — this is the basis for good governance, that will allow for integration, multiple-use and participation of key stakeholders. Identify key stakeholders, organize them, encourage/facilitate cross-sectoral coordination, empower them (LGUs, other government agencies, civil society groups, research and technology development groups).

"Thou shall not judge the book by its cover," but with a watershed you can. Forest cover is a reflection of skills and motivation of actors and players, it indicates the state of health of a watershed.

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Processes and Methods

The project calls for a community-based demand driven approach. This requires a major change in the way watershed management projects are formulated and implemented.

Communities, therefore, need to be:

- Sensitized and mobilized from the start; and
- Empowered to directly participate in the formulation, appraisal, approval, implementation, monitoring and review of the plans for improved management of their local watershed resources.

The original management plans for Kaliwa and Maragang watersheds were formulated in a conventional top down manner by external consultants. There was little, if any, active community participation in the planning process. Project staff made efforts to refocus both pilots to a more bottom-up, community-based approach. However they have been handicapped by the constraints imposed by the original plans.

The following are some of the other key lessons learnt concerning the adoption of a community- based demand driven approach to watershed management:

- Mobilizing and empowering communities takes time, particularly with indigenous minorities, as project staff have to win their trust and respect;
- Where barangays contain a mixture of original occupants and recent settlers they may be ethically diverse and have little in the way of a traditional community spirit on which to build;
- Empowering communities will encourage local innovation and experimentation, resulting in the development and adoption of a wider range of productive and conservation effective livelihood activities than originally envisaged by the project planners;
- Investment in extension, particularly using people-centred adult learning methods such as cross farmer visits, has contributed to the successful adoption of a range of improved watershed resources management activities;
- Likewise, investment in information, education and communication (IEC) programs has had a high payback in bringing about major attitude changes with regard to the willingness of individual households and communities to improve the management of their local watershed resources.

Projects and Programmes

Key strategic lessons learnt for the planning and implementation of watershed projects and programmes include:

- Pursuing a community-based approach requires that planning, implementation and review are sequential components of an on-going process rather than separate exercises;

- Watershed resources management plans should start with individual barangay and sitio's 'comprehensive' land use plans which are subsequently combined, and reconciled, within the framework of the overall watershed;
- It takes time to build community-based peoples' organizations that can sustain, and initiate new, watershed management activities post project;
- In contrast to livelihoods based on annual crop production, the benefits (ecological and economic) from planting trees and other perennial cash crops will not be apparent for many years; and
- A community-based approach to watershed management, therefore, requires long-term (minimum 10 years) sustained project or programme support.

Policy and Legislative Environment

Some lessons learnt:

- There are still many conflicting watershed/protected areas proclamations which create uncertainty as to what, if any, commercial livelihood activities can be pursued. Operationalising the concepts and principles of the project will, therefore, require the revision, or revoking, of various restrictive legislative instruments that currently limit the options for a community based approach to the multiple use of watershed resources;
- One of the key policy and legislative lessons is the need to provide long-term secure tenure rights to existing watershed occupants before they will have any incentive to assume responsibility for improving the management of their local watershed resources; and
- While CBFMAs, PACBRMAs, CADCs etc are being applied for within the Forestlands, it is unclear as to how management will be improved in the remaining Forestlands, and the A&D lands. There is also some uncertainty as to the future rights to harvest timber trees planted within the contracted portions of the Forestlands.

Institutions

Some lessons learnt:

- While both the Kaliwa and Maragang pilot projects are currently seeking to establish multi-sectoral and LGU-based watershed management councils, this should have been undertaken at the start of project planning to ensure a feeling of 'local' ownership of the management plan;
- Devolving responsibility for the planning and management of watershed areas to multi-sectoral and LGU-based watershed management councils was a key strategic element of the project. mechanisms for operationalising this have yet to be fully developed; and
- While some extension and research support has been provided by the two pilot projects, this has been based on using project staff and/or externally contracted resource persons; and
- Very little attention has been given to developing, and strengthening, the capacity of local advisory support services (CENRO/PENRO, MAO, NGOs etc) to meet the current, and future (post project), needs of the watershed occupants for extension and research assistance.

Technologies

Technological lessons include the need to:

- Determine the watershed's actual degradation status and identify key 'hotspots' for targeted interventions;
- Assess the suitability of the watershed's natural resources for different productive uses and/or biodiversity preservation; and

- Assess the on-site, and off-site, impact of current land uses, and alternative improved ones, with regard to sustaining the productive and protective functions of the watershed.

Other technological lessons include:

- There is an inherent bias towards contract reforestation and planting of tree crops as the primary components of watershed rehabilitation;
- Need for more attention to be given to developing and promoting conservation effective forms of upland food and cash crop production, and improved grassland management for livestock, given their importance in upland households livelihood systems;
- Likewise, recommendations need to be given for improved management of the crop component within agro-forestry plots, not just the fruit tree component; Need to review current contract reforestation practices with regard to cost (high) and species planted (typically limited); and
- There is still a heavy emphasis on planting significant areas to fast growing exotic trees (*Gmelina, Acacia,* etc.) that could potentially have a negative impact on water yield and bio-diversity.

Livelihood Opportunities

Lessons learnt from the livelihood activities of the two pilot projects include:

- For most of the participants the primary perceived benefit from engaging in contract reforestation activities has been the waged employment;
- Illegal logging and other degrading land uses can be reduced by enabling watershed occupants to develop alternative livelihood activities; and
- However there is a need for livelihoods that will provide worthwhile short term returns, to meet immediate household welfare needs, while waiting for reforestation and agroforestry plantations to start yielding harvestable products.
- Livelihoods based on the production and sale of bulky perishable products (fruit and vegetables) are critically dependent on good market access (via improved roads and trails);
- There is a risk with planting perennial tree crops that when they come into production (in 5-10 years) the market may be less attractive than at the present time, should the increase in supply exceed future demand;
- Insufficient attention has been given to identifying livelihood opportunities based on the sustainable utilization of minor forest products (rattan weaving, medicinal plants, wild fruits, mushrooms etc) that would provide an incentive to protect and regenerate, natural forest areas within CBFMAs and PACBRMAs;
- Many POs are still uncertain as to the future long-term financial benefits that would accrue to their members from the reforested areas within the CBFMAs and PACBRMAs.

Funding

Strategic lessons learnt include:

- Watershed management project activities are still totally dependent on funds from national government and donor sources;
- LGUs have yet to allocate more than a token proportion of their IRA funds for managing their watershed resources;
- Downstream beneficiaries have yet to fully contribute to the costs of upstream watershed management through water pricing, and other watershed resource user fees;

- There is a need to identify tangible on-site financial and social benefits that would encourage private investment in improved watershed resources management;
- Providing seed money, for community based revolving funds, can supplement the limited financial resources, of upland households and communities, available for investment in improved livelihood activities, and other watershed resources management activities;
- Contracted POs have retained a proportion of the wages, paid to their members for engaging in reforestation and other activities, and used this as the seed money for their revolving fund.

Monitoring and Evaluation

There is still a need to develop:

- Locally appropriate sets of bio-physical indicators, to monitor the ecological impact of improved watershed resources management, and to detect trends in the degradation status of watershed areas;
- Culturally appropriate sets of socio-economic indicators, to monitor the impact, of livelihood projects and other watershed project activities, on the welfare and poverty status of the watershed's occupants;
- Tools and approaches to directly involve the stakeholders in the participatory monitoring and evaluation of the status of their watershed resources, and the ecological and socio-economic impact of their own watershed resources management activities.

DENR-LGU-Community Partnership in Forest management: The Case of Wao in Lanao del Sur

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The Local Government Code provides that local government units shall share with the national government the responsibility in the maintenance of ecological balance within their territorial jurisdictions. In fact, said Code went on to devolve certain forest management functions to the LGUs such as implementation integrated social forestry projects, management and control of communal forests, establishment of tree parks, greenbelts and similar projects and enforcement of forestry laws in community based projects.

I. Status of Devolution and DENR-LGU Partnership

To implement the devolution, DENR issued Administrative Order No. 92-30 entitled "Guidelines for the Transfer and Implementation of DENR Functions Devolved to Local Government Units." In 1998, DENR and DILG issued Joint Memorandum Circular No. 98-01 entitled "Manual of Procedures for DENR-DILG Partnership on Devolved and Other Forest Management Functions."

Except for the very successful co-management approach in Nueva Vizcaya, devolved functions have been limited to ISF projects. To date, there are yet no communal forests and small watersheds devolved to LGUs.

In the results of the recently concluded nationwide consultations on proposed devolution / co-management of watersheds conducted by DENR from February to March 2003, majority of the LGUs expressed willingness to accept devolution but would like to be clarified on the extent of devolution in terms of areas, activities and functions. From the DENR side, the consensus is that DENR and LGU can be active and complimentary partners. The DENR field offices likewise felt the need to be clarified on the functions and extent of devolution.

II. DENR-LGU Partnership: The Case of Wao, Lanao del Sur

Profile of Wao

Wao is a 5th class municipality located in Lanao del Sur. It is part of the Autonomous Region for Muslim Mindanao. It has an area of about 31,218 hectares. 14,000 hectares of these are classified as alienable and disposable land while more that 50% or 17,000 hectares are classified as timberland. It has a population of about 36,000 based on 2000 NSO Census with majority under the age of 40.

Despite being a part of ARMM, Wao has a diverse culture. It is predominantly a Christian community with about 20% composed of Maranaos and 80% made up of Ilongos, Cebuanos, Ilocanos and Batanguenos.

Wao is located in the heart of Mindanao. It is accessible from major Mindanao cities. Well pave roads connect it to Cagayan de Oro, Davao and Cotabato. It is gifted with five river systems that supply water to six municipalities.

Upland Destruction

The town's stable peace and order condition and low crime rate attracted more and more people into Wao. Many of these migrants are now occupying areas classified as forest lands. Due to its accessibility, illegal logging became rampant. The presence of a TLA in the area largely contributed to the rapid occupation of the forest lands as logged over areas were encroached by the *kaingineros* and illegal loggers.

Because of these illegal activities, the town began to experience flash floods, long dry season during summer months and the watersheds began to experience water shortages.

Local Government Efforts

Alarmed with these forest destruction activities, the town headed by its dynamic Mayor, Hon. Elvino C. Balicao Sr., embarked, among others on massive tree planting activities, establishment of a municipal nursery, and massive information campaign on the importance of forest protection and preservation. In 1998, civil society organizations of both Muslims and Christians barricaded the roads to prevent the TLA from transporting logs from Wao. After long and hard struggle, the TLA decided to cease operations.

Despite all these efforts however, the problem of illegal logging and forest encroachment continues. Illegally cut logs continue to leave Wao. Forest protection became a cat and mouse affair. These problems were compounded by the presence of Southern Philippine Development Authority which claimed jurisdiction over most of the Wao's forest lands and the minimal involvement of the DENR.

Opportunity for DENR-LGU-Civil Society Partnership in Forest Management through the Forest Land Use Planning

Given the above scenario, Wao applied for technical assistance under the EcoGovernance Program on how to better manage the forests.

In June, 2002, the first public consultation on the status of Wao's forests and watersheds, problems, etc. was conducted. Representatives from various sectors attended the meeting. There was an outpouring of sentiments with some sectors blaming DENR, the LGUs, the SPDA and others for the sorry state of their forests. In fact, some participants felt that nothing much would happen out of that meeting.

At the end of the consultation however, the following were arrived at:

a) That total collective actions and decisions from the DENR, the local government unit and civil society will be needed to address the various problems. The participants agreed to form a technical working group which will work on the preparation of municipal forest land use plan.

b) That they will request the DENR ARMM to set up a check point in Wao.

c) That the municipal government of Wao would provide the necessary financial resources for the preparation of the FLUP while the ECOGOV Project and DENR will provide technical assistance.

The Forest Land Use Planning Preparation

From June, 2002 to May, 2003, the forest land use planning exercise was done. DENR ARMM did not only set up a checkpoint but established a CENRO office in Wao. The Municipal Government on the other allocated P455,00 for the FLUP preparation.

The participation of the DENR, LGU and Civil Society in the TWG became an opportunity for the various sectors to work together. They were involved in the socio-economic profiling, situational analysis, allocation and prioritization of sub-watersheds, public consultations and plan preparation and review.

While the FLUP was being prepared, a paralegal training on forest protection was conducted. Subsequently, confiscations of big volumes of illegal cut logs and lumber were made, owing to the participation of the other sectors in forest protection.

The municipal officials and some others went to Nueva Vizcaya to observe the co-management approach.

Status of FLUP Preparation

The FLUP has been completed. It has been endorsed by the Sangguniang Bayan, the Mayor, the CENRO and the PENRO. It now awaits the affirmation of the DENR-ARMM Secretary.

The SPDA has likewise been involved in the FLUP preparation and a co-management among DENR-LGU and SPDA is being envisioned in the management of Wao's forests. SPDA's full involvement however is subject to the legal issue because of its deactivation under EO 149.

Implementation Arrangements

Under the proposed implementation arrangements, the parties have agreed that all forestry activities shall be in accordance with the FLUP. The issuance of tenure, allocation and utilization instruments and permits inside the forest lands shall be made by the DENR but the LGU prior comments will be obtained.

DENR ARMM will provide technical assistance to capacitate Wao and delineate the devolved forestry projects and will assist the LGU get their share from the national wealth.

The Municipality of Wao on the other hand will provide the regular budget to implement the FLUP, create an ENR office, pass the necessary ordinances and resolutions as will effectively implement the FLUP and initiate tree planting activities.

Institutional Mechanism

To monitor the implementation of the FLUP and assist in forest protection, an ENRC will be created composed of the DENR, the LGU, other government agencies, Muslim leaders and other NGOs.

III. Wao Case: Opportunity to Demonstrate DENR-LGU-Community Partnership and Co-Management under DENR-DILG JMC 2003-01

On May 7, 2003, DENR and DILG signed JMC 2003-01 entitled: Strengthening and Institutionalizing DENR-DILG-LGU Partnership on Devolved and Other Forest Management Functions."

This JMC reiterates previous issuances on devolution and partnership. It also calls for the immediate convening of the National Steering Committee. Additionally, JMC 2003-01:

- Decentralize the signing authority of DENR Officers to enter into MOAs with LGUs on devolved and proposed co-management areas, and those approved under FLUP.

Up to 1,000 ha	CENRO
>1,000 ha up to 5,000 ha	PENRO
>5,000 ha up to 15,000 ha	RED
>15,000 ha up to 30,000 ha	USEC for Operations
>30,000 ha	Secretary

- Allows co-management of watersheds and other forest areas
- Require DENR to solicit LGUs comments prior to issuance of tenure instruments and utilization permits
- Enjoin LGUs to provide funds to make devolution, partnership and co-management effective.

The completion of the FLUP for Wao and the issuance of JMC 2003-01 are timely milestones to demonstrate DENR-DILG-LGU Partnership and Co-Management of Forest areas. As already stated, in the case of Wao, said municipality has to deal with SPDA and DENR. This now becomes easier under the concept of co-management.

IV. Potential Impacts of JMC 2003-01

The issuance of JMC 2003-01 yet presents another opportunity to really involve the LGUs in forest and watershed management. If implemented, the following are the likely potential impacts:

- Improvement of forest cover of watersheds due to co-management agreements that allow decentralized actions;
- Possibility of increased investments for watershed and forest development due top decentralized mode of addressing property rights;
- Possibility or reduced soil erosion; and
- Empowerment of LGUs in protecting and managing watersheds

The Requirements for the Institution of a User Fee System in a Watershed Context

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This paper discusses the conceptual basis of instituting a user fee policy and its application to watershed management. As economic instruments for natural resource and environmental management, user fees have historically enabled governments to obtain a share of the rents from commercial natural resource extraction as well as control air and water pollution. Despite their limited application to issues facing the green and brown sectors, past policies could provide ideas on how to implement a user fee policy in the different context of watersheds. Adapted to such a context, the lessons culled would help the country improve the watershed's capacity to provide critical resources and environmental services and ensure their sustainability.

The application of a user fee policy to watershed management, however, requires an appreciation of the policy's peculiar functions, the nature and quality of multiple resources and environmental services, as well as the problems and relationships of the various stakeholders in a given area. An understanding of these factors gives better perspective not only of the particular challenges and constraints associated with policy implementation but also of the specific requirements that must be put in place.

To concretize the watershed conditions in which a user fee policy might be applied and the particular environmental and social problems it must address, the paper also provides a cursory and preliminary discussion of the water resource situation in Nueva Vizcaya and North Cotabato. Not only does it identify the particular realities and problems of the two provinces, it also outlines the general courses of action in the implementation of a user fee policy.

The paper is divided into three parts:

- The conceptual framework of a user fee policy as an economic instrument for environmental management in general, and for watershed development and protection, in particular;
- The concrete environmental conditions of the watersheds in Nueva Vizcaya and Kidapawan, North Cotabato that may require the implementation of a user fee system, specifically the current use of raw water for domestic consumption and irrigation; and
- The necessary conditions or critical steps in the development, introduction and implementation of an appropriate user fee system in the two provinces.

1. Conceptual framework

1.1 The user fee in the green and brown sector

Economic instruments consist of policy tools in the form of input or user fees, charges or taxes, tradable or marketable permits, and subsidies for environmentally friendly activities. Historically, these tools have been implemented in the natural resource (green) or urban (air-water) environment (brown) sector within or outside watersheds. Specifically, user fees or resource charges have been applied to the extraction of particular natural resources, such as forest products and water resources. Economic instruments have also taken the form of pollution fees, emission or effluent charges in the control of pollution or the use of particular environmental media (air, land, water) as a sink or waste dumps.

In different countries, the state through an environmental management agency has played a primary role in the introduction and enforcement of economic instruments, including a user fee system. The agencies usually perform multiple functions. They establish standards or allowable levels of economic activity, emissions, or effluents; organize accompanying monitoring and reporting systems to determine levels of activity and detect violations of standards; and levy after investigation the corresponding fees on activities and penalties for violations. The state through such agencies also institutes an adjudication or conflict resolution process to address appeals, command compliance and settle differences between the implementing state agency and the regulated community. The object of the State's environmental management system is thus to regulate the use of particular natural resources and address the problem of air, water and land pollution.

In the Philippines forestry sector, a user fee in the form of a forest charge is imposed on the allowable level of extraction while a penalty, such as the silvicultural fee (that is set 4 times the forest charge rate) is levied on logging damages of residuals that exceed the allowable volume. Similarly, pollution charges are imposed on current detected levels of emissions, effluents, discharges, or wastes that exceed the allowable standard. Operationally, these unallowable levels represent what economic theory would call the negative externalities of economic activities or the sources of damage to the environment or human health. In economic parlance, therefore, the purpose of a user fee is to address current negative externalities above the allowable standard, as well as deter future occurrences.

Whether as user fees or resource charges, economic instruments (EIs) have been implemented as part of the state's regulatory-enforcement structure for environmental management or its command-and-control (CAC) regime. With the evolution of the implementation of these instruments in time, they eventually came to be known as market-based instruments (MBIs) that are distinct from the penalties of a pure CAC regime. The emergence of MBIs, however, did not entail the dismantling of the CAC structure. Instead, together with other MBIs, user fees continue to use the environmental standards set by traditional CAC regulations, and build on the already-existing system of permits (for economic activity or waste disposal), reporting and monitoring practices, the treatment or assessment of violations, systems of fines and penalties, and mechanisms for adjudication and conflict resolution.

1.2 Other features/ aspects of the relationship of the state and the regulated community

As regulator, the state's environment agency has related to the regulated community not only as a vigilant law enforcer. It has not simply dealt with its members as potential culprits, criminals or violators, but more importantly also as potential ally in the promotion of a better environment. As a consequence, the state's environment agency has not only maintained a regulatory structure to detect and penalize disallowed externalities but has designed economic instruments and incentives for the promotion of more positive economic behavior as well. Against this backdrop, a user fee policy has had the additional objective of changing the production and consumption behavior of the regulated community.

How the state environment agency seeks to change the behavior of polluters depends on the approach to the implementation of a user fee policy and the mode of fee revenue allocation. In this regard, there are three ways to implement a user fee policy.

One is as a financial incentive that implicitly rewards those who pollute less while imposing costs on those who pollute more (Anderson 2002). Set at a base fee for each pollutant, fee payments may vary with the level of concentration of the pollutant. As the level exceeds the standard for a particular pollutant, the fee is applied with greater pollution resulting in larger fee payments. As polluters pay more fees, revenues increase for the state.

A second way of implementing a user fee policy is to set it with the goal of capturing the unaccounted costs to the environment and human health. With this objective, policy formulation would require particular data to measure the extent of potential damage or harm, such as the volume and toxicity of the pollutant, the type and size of the user, the characteristics of the receiving environment, the heat load, and the potential health threat to the receiving community, among others. Based on the measured damages polluters have inflicted on the environment, the user fee serves as a means to partly, if not fully cover the negative externality. Like the first mode of implementation, the second approach could generate revenues for the state, especially if the damage is significant. The efficiency of the user fee system for environmental management, however, would depend on how government will use these revenues.

The third approach to user fee implementation is to set it on the basis of the cost of abatement programs and technologies that polluters can put in place. If the abatement program or technology is less costly than the fee payments to government for damages or pollution, then the regulated business entity undertakes abatement investment that is beneficial for itself and the rest of society. With the use of abatement cost surveys, the state can therefore set the optimum fee that would induce producers to invest in a more appropriate technology. Unlike the first two approaches, the third approach does not generate state revenues. Instead of paying the fees, the potential polluter invests on an abatement technology.

The efficiency of the first and second approaches depends on the utilization of the collected funds. User fee payments provide revenue that may be used either for general government expenditures, or earmarked for agency operations, such as the costs of giving government permits, monitoring compliance, and enforcing programs. If they are set aside for environmental management, the fee would consist of a fixed amount to cover administrative costs and a variable portion that may be used as seed money for an environmental fund. Disbursed as grants, "soft" loans, interest rate subsidies, loan guarantees, or equity investments (Speck 2001), the collected user fee revenues are used more efficiently if they are allocated for priority remedial environmental actions or as subsidies for environmental infrastructures.

Klarer (1999) argues that the success of economic instruments particularly user fees depends on whether collected funds stay in the environmental sector or not. If they do, then "environmental funds, as long as their revenue base is income from environmental charges, taxes and fines, recycle revenues from polluters in general to the polluters responsible for activities requiring remedial action on a priority basis. In this way, in fact the combined charges/ subsidies system may retain the efficient property of an economic instrument." In other words, a user fee policy for the establishment of an environmental fund is both an efficiency measure and a redistribution mechanism for priority environmental remediation projects.

1.3 Purpose of the user fee in the watershed context

How will a user fee figure in the watershed context? A watershed performs many economic and environmental functions. Appendix 1 provides a list of the various functions of the natural environment (production, carrier, regulatory, and information), the different watershed resources, the different activities supported on the land, and the types of knowledge that may be drawn from the watershed (de Groot 1994).

Apart from the production of water, food, raw materials, and other resources, the watershed also performs a number of carrier and regulation functions that are enumerated in Figure 1. Under undisturbed or stable conditions, the watershed essentially performs benign regulation functions that provide beneficial forms of environmental services, including the determination of local climate conditions; prevention of runoffs or floods; the maintenance of dry season flows and flood controls; control of soil erosion and sedimentation; maintenance of water quality (control of sediment load, nutrient load e.g. phosphorous and nitrogen, chemical load, and salinity); topsoil formation and soil fertility maintenance; groundwater recharge and the regulation of the water table (e.g. reduction of

salinity); and the maintenance of aquatic habitats, such as keeping the water temperature low by shading rivers and streams. Because these environmental services are free, the uncompensated benefits derived from them constitute Nature's positive externalities.

Figure 1 suggests that the carrier functions of the watershed are critical to the provision of environmental services. The pattern of land use or its allocation for nature protection, settlement, agriculture, recreation, and other uses could determine the quality of environmental services provided. In other words, the form in which the carrier functions of the watershed are carried out may either disrupt or sustain the watershed's regulation functions. In turn, the operation of its regulation functions determines the availability and quality of the water resource.

When watershed conditions deteriorate, however, the natural benign services they render become scarce and particular regulation functions cease to operate fully. For instance, a degraded watershed results in a less congenial local climate, flood damages, excess sediment production, reduced groundwater recharge, soil nutrient and other resources losses. Economic damages or losses are, in turn, the consequences of diminished or lost environmental services. The continued economic use of a degraded, unstable environment without mitigating measures exacerbate the situation, further diminishing the environmental services and bringing more negative externalities.

Figure 1. Water Production and Other Related Functions of a Watershed

Production Functions	Carrier Functions	Regulation Functions
Water	Space for human habitation, settlement	Local and global climate
	Cultivation, animal husbandry, aquaculture	Prevention of runoffs and floods
	Energy conversion	Water catchments and groundwater recharge
	Recreation and eco-tourism	Control of soil erosion and sedimentation
	Nature protection	Topsoil formation and soil fertility maintenance

The application of an environmental user fee (EUF) policy for watershed services has at least three different objectives corresponding to particular modes of implementing user fees. First, the EUF is a means to discourage or penalize present and future activities that bring about negative externalities. Second, it is an expression of the positive value of benign regulation functions or the free beneficial services of the watershed. The payments made by watershed service users in effect become the compensations for the use of the beneficial environmental services. Third, the EUF generates the resources that may be provided as incentives to those who undertake activities that enhance positive externalities. The resources may also be pooled and set aside as an environmental fund to finance the protection of the watershed and reparation of damages. Moreover, the environmental fund may be used also for the restoration and improvement of the watershed's capacity to provide services.

1.4 Constraints or requirements for the implementation of a user fee policy

A number of conditions constrain or prevent the valuation, compensation, restoration and sustainability of the beneficial services of the watershed. The enunciation of a user fee policy requires addressing these constraints. Specifically, the following imperatives are entailed before the policy can be implemented.

- First, because the regulation functions of a watershed involve complex physical processes, the tangible outcomes of environmental services must be identified and valued. Such outcomes are either inputs or necessary conditions for economic production.

- Second, valuation methods are necessary to determine the value of environmental services since they are not directly observable and there is no market to signal such values. Watershed services may be valued in terms of their future loss or the cost of damages due to their unavailability or degraded state.

- Third, given the absence of a market or an immediate identifiable producer or supplier that would ensure an adequate supply of particular environmental services, the supply side of the market can only be initially formed when potential suppliers are identified and have expressed willingness to become service providers.

- Fourth, it is necessary to address on the demand side the free-rider problem or the absence among environmental service users of willingness to pay. Because many environmental services are not subsumed under any property rights system that would require legal payments for their use, and the culture has not emphasized the maintenance of public goods for everyone, they are generally perceived as freely accessible. As such, non-excludability and non-rivalry are inherent problems. Non-excludability means that consumers cannot be prevented from enjoying a good or service even if they do not pay for its use while non-rivalry means that the consumption and payment of a good or service by one individual does not reduce the amount available to others. In other words, as long as the conditions of non-excludability and non-rivalry hold, there would be no incentive for individual consumers of services to pay for the benefits unless they formally agree as a group of beneficiaries to pay for the environmental services they use. In the absence of a market, the forging of this agreement is a critical task for a third party.

- Fifth, because of the free-rider problem and the absence of property rights, there are no incentives for potential suppliers of environmental services to invest in ensuring the supply. Without such investments, the facility that provides the service or the service itself depreciates. Thus, it is necessary for the disincentive and the under-investment problem to be addressed. Either property rights over the resources necessary for production are given to the potential suppliers of environmental services or a formal agreement that the services they provide would be compensated is required. Formalizing the agreement between the consumers and the providers of environmental services entails a third party mediator that would specify the cost (user fee) of such services and the rights and duties of each party.

- Sixth, the required activities to guarantee the provision of environmental services or the so-called positive externalities must be specified, as well as the activities that generate the negative externalities or cause damages to the watershed's regulation functions. These activities are akin to the CAC "standards" used to monitor the behavior and compliance of service providers and users. If upland or upstream providers, for instance, meet or exceed the (minimum) standards for land use, then they are rewarded. If they do not meet the standards, then they are not compensated. However, they must be supported through extension services, technical assistance, and subsidies to enable them to meet the standard or generate the desired environmental services.

- Seventh, while the state plays a primary role in the formulation and implementation of a user fee policy in a CAC regulatory structure, it is not the only agent in local watershed management.

The third party mediator and organizer of beneficiaries and service providers may either be a local government or non-governmental organization. Furthermore, the standards used, the agreements between parties and the specifications of the user fee policy do not have to emanate from a national legislation or executive order. Instead, they may be the product of local consultation and consensus.

Summarizing some of the above requirements, Figure 2 specifies the tangible services, functions or outputs that the environment provides. It identifies both the natural processes and potential human agencies involved in the provision of environmental services. Among the human providers are upstream communities, establishments, local government unit or environmental agencies. Some of these local agencies may not yet be in operation or are ineffective. Apart from the service providers, various beneficiaries comprise the other party to the agreement. Among the beneficiaries are government agencies, local government, individuals, occupational groups, and private business establishments. Together the providers and beneficiaries constitute the potential market or co-management arrangement that formalizes the user fee and the system of rewards and penalty.

The fee or penalty payment could be determined systematically by valuing the cost of particular environmental services. The value may be estimated by the health, economic and environmental damages resulting from the loss or diminution of services. The last column lists some of the estimation or valuation methods for particular services. The role of the state, local agencies, organizations, and communities is critical in the determination of the estimated cost or valuation method.

Figure 2. Matrix of Environmental Services, Providers, Beneficiaries, Damages and Valuation Method

Environmental Service	Service Providers		Beneficiaries	Damage, Costs	Valuation Method
	Nature	Human Agency			
Surface water volume Groundwater Recharge	River Precipitation Forest Vegetation Stream flow Slope stability Soil erosion control	Forest (headwater) agency Upstream land management agency Upstream & riverine community	Water District Local government Concessionaries Private well owners (household establishments) NIA Farmer Irrigators assoc. NPC Hydroelectric power consumers Fisher folk	Reduced irrigation services Lower Agricultural output High energy cost Lower production & income Ground water depletion Increasing energy cost Prospective future consumers	Productivity loss Energy cost Depletion Premium
Surface Water Quality	Waste assimilation	Establishments upstream and alongside the river Water quality protection agency	Recreation boat travelers	Income effects of flood or drought Health and livelihood impacts of water pollution	Cost of illness Human capital approach
Recreational		Resort facility Owners Local government	Local government Local business Labor Visitors, tourists	Water pollution Garbage accumulation	Health cost Cost of waste management
Waste disposal (sink) Service	Body of water Air shed Landfill	• Local government	Garbage producers Garbage disposers Polluters	Water, air, aquifer pollution Health effects	Health cost Mortality risk

II. Exploring the implementation of a user fee system in watershed management: Nueva Vizcaya and Kidapawan as illustrative cases

2.1 On the general watershed conditions

My preliminary assessment of watershed conditions in Nueva Vizcaya and Kidapawan, North Cotobato are drawn from a cursory study of existing documents and a limited number of days for data gathering and field appraisal in the two places.

2.1.1 Open access, forestland conversion, and mountain stream diversion

Most forestlands in Nueva Vizcaya and North Cotobato are under open access. In Nueva Vizcaya, for instance, about 78 percent of them particularly those in the lower Magat watershed are without any tenure instrument. Open access has certainly allowed migrants (for instance, from Arakan in Kidapawan, and from Ifugao and within the province of Nueva Vizcaya) to search for subsistence or livelihood opportunities in the forestlands of the province. A favorite destination of migrants in Nueva Vizcaya has been the cancelled pasture lease areas; in Kidapawan the forest reserves and the prospective areas under the Certificate of Ancestral Land Titles.

Due to illegal logging, upland farming, and other more recent, if not earlier disturbances, like mining in Nueva Vizcaya, mountain creeks and upland streams have been diverted, if not lost. In turn, this has reduced the stream flow of rivers and the volume of water available for domestic use and irrigation. These disturbances have also contributed to the sedimentation of irrigation canals and intake structures, and the siltation of dams.

In the upland forest areas of Kidapawan, Magpet, Makilala, as well as in Nueva Vizcaya, large commercial farms and small vegetable plots respectively have been established. These land conversions have certainly had an impact on soil erosion and water use; the extent of which, however, must still be validated and quantified.

2.1.2 Earthquake and El Nino effect on water discharge and river flow

Natural disturbances, such as the earthquake in 1990 and the El Nino in 1986, 19 Oct 1998 to May 1999 and the 2002 – 2003 occurrences have also contributed to the destabilization of the environment in both provinces. The more recent El Nino effect in North Cotobato is said to have been more severe at the start of the year. Together with other factors, the two natural disasters brought about a 50 percent reduction in water discharge during the period.

In Nueva Vizcaya, the earthquake and other factors such as deforestation accounted for the change in the course of river streams. Some no longer flow into the intake structures for irrigation. The earthquake and the deforestation also resulted in the instability of the land. With erosion and slope failures, sediments have accumulated in the riverbeds and caused riverbeds to emerge in the open. As a consequence, most irrigation dams that had been designed 1 meter below the riverbed are now 1 meter above the riverbed. It is estimated that in almost all of the rivers in Nueva Vizcaya, the annual built-up of silt and sediments from 1991 to the present is about 5 meters. Unfortunately, there are no available funds for the dredging of Magat River, watershed rehabilitation, and upstream impoundment dams.

2.1.3 Water shortage for domestic use and irrigation

A water shortage problem has emerged in both provinces. It is not only confined to a particular site. Water has become a problem in upland areas, lowland farms, and urbanizing areas. The problem is manifested in inadequate water supply for both domestic use and irrigation. In some upland areas of Nueva Vizcaya, like Kayapa, Ambaquio, and Kasibu, the water level of intake boxes has declined. Most intake irrigation structures are also unable to provide water in the dry season, and are not able to store enough water in the wet season for later distribution. Irrigation of the lowlands, and possibly the recharge of the aquifer, has also been affected by the diversion of upstream surface water resources for upland irrigation and the subsequent reduction of downstream flows. AS one moves from the upstream to the downstream areas, the proportion of farms that are irrigated thus decreases. The results seem to be a zero-sum game in the allocation of water between the upland farms and the lowlands.

In District 2 of North Cotobato, for instance, two communal irrigation systems (CIS) have been built in areas with higher elevation, like Mabalcol and Carmen, in addition to the national irrigation system (NIS) in Kabacan. Ironically, the supplemental upstream CISs have affected the production capacity of the Kabacan NIS. Possibly due to the groundwater extraction of the many PNOC wells and the pumping activities of banana plantations in the area, the volume of stream flows has also declined, and may have affected aquifer recharge. In part of the city of Kidapawan, NC and Bayombong-Solano, NV, water is unavailable in particular hours of the day. In District 1 (Pigkawayan, Midsayap, Palma) of North Cotobato, the water table seems to have gone down because the 60 ft deep wells, for instance, built in 1995 now have difficulty in extracting groundwater.

2.2 On the domestic water situation

2.2.1 Population growth and increased number of spring boxes and private wells

With the growth of the population in the two provinces, there is greater demand for domestic water in the city and towns, as well as in upland communities. To meet this demand, the provincial and city governments in North Cotobato have provided barangay deep wells. In particular, the provincial government has also financed the construction of spring boxes in the higher elevations near their sources.

In its effort to expand its service area and improve operations, the water district of Kidapawan has begun laying out new pipes and identifying new water sources. At the moment, however, almost all barangays cannot rely solely on the water district. Except for the Poblacion, almost all barangays continue to depend on their deep wells. Some private establishments and households have also established their own wells, more likely without any permit from the National Water Resources Board (NWRB). The single establishment with the most number of deep wells is the PNOC. Further studies must be done to determine whether the increased number of deep wells together with the growing number of spring boxes in the uplands have had negative effects on the water supply in downstream communities.

2.2.2 The financial imperatives of domestic water suppliers

The Water District of Kidapawan supplies the water needs of the city by sourcing its raw water from natural springs and a dam on the Saguing River. At present, it cannot provide water continuously. Neither could it supply water to all parts of the city because of inefficiencies, illegal tapping and leakages, as well the district's limited capacity vis-à-vis the growing demand. Aware of the need to expand and improve its facilities, the water district of Kidapawan has raised water rates and began investing in larger transmission pipes. It has also begun planning to tap additional spring sources and establish new deep wells.

The Water District, however, is constrained by its poor financial position and the inability to secure control over its spring sources. These springs are located in an area that is now being claimed by indigenous people who supposedly hold a CADT over the area. Hence, securing access to these water sources requires that the Water District obtain a Memorandum of Agreement with the indigenous people. Whether the indigenous people will agree to a MOA and whether the District could provide attractive terms, given its poor financial position remains to be seen.

Like Kidapawan, the Provincial Water Works of Nueva Vizcaya has the same imperative for expansion and the constraints posed by its financial and supply conditions. Unlike Kidapawan, however, the Provincial Water Works has not been able to raise water rates. It continues to charge a lower rate. This may partly be the reason why it incurred deficits in two years of operation from 19 to 19 . During its surplus years, however, it has not been able to set aside funds for capital build up or for investments in new facilities. In order to expand and meet the growing demand for domestic water in Solano and Bayombong, Nueva Vizcaya's Provincial Water Works must tap the excess surface water and divert it away from irrigation. The controversial measure, however, would run counter to the interest of farmers. Unless this zero-sum condition is resolved, new water sources must be identified.

2.3 Water shortages and conflicts

2.3.1 Inadequate irrigation supply and the state of disrepair

Deforestation, earthquakes and natural calamities, and sedimentation have adversely impaired the performance of irrigation facilities within the two provinces. Some facilities could an only provide water to 50 percent of the service areas, and are hardly able to supply sufficient water in the dry season. Interestingly, the communal irrigation systems (CIS) of District 1, North Cotobato (consisting of Midsayap Beluyo, and Buluan-Pigkawayan of Palma) were said to be in good conditions in the early 1990s. A decade later, however, the CISs could only irrigate half of the area. Because of the more extensive deforestation in District 2, the area faces a much worse water shortage condition.

In an effort to give a semblance of order, the National Irrigation Authority has resorted to water rationing. This remedial approach, however, could not foster cooperation among farmers nor could it prevent them from pursuing interests that may be inimical to long-term water supply.

Farm communities at higher elevations in Nueva Vizcaya seem to have an advantage over lowland farms. Upstream communities apparently are able to get prior access to the water and divert it to their farms to the consternation of their lowland counterparts. Organized in irrigation associations, downstream farmers complain that upland farmers have illegally tapped and diverted water or have drawn water from the association's impoundment dams. They also complain that the land clearing and farm practices of upland farmers have caused the silt and sedimentation downstream and adversely affected the delivery of irrigation services. Hence, the lowland farmers call for restricted access to upland farm holdings, land clearing activities, and particular farm practices. Conflict has therefore emerged between upland farmers and some irrigation associations.

Conflicts, frustrations and disorganization are also present within the irrigation associations. Probably as a manifestation of the free-rider problem, if not the state of disrepair of the facilities, many farmer-members neither pay their irrigation service fee nor provide labor for canal maintenance. Farmers seem to have resorted to individualistic behavior, such as gathering their own water supply and storing them in man-made lagoons or stealing water from their neighbors. Possibly the lack of leadership and appreciation for collective action has contributed to the problem, apart from the low ability and lack of willingness to pay among irrigation users.

2.3.2 Conflicts to be resolved

Figure 3 shows the various stakeholders identified in the above discussion and the possible matrix of social relations among them. The positive sign (+) reflects the solidarity or shared interest between two cooperating groups while the zero (0) mark signifies the absence of information or relationship between two groups. The negative sign (-) indicates the possible conflict existing between two groups, such as between the water district and indigenous people or irrigation association, or between the irrigation association and upland farmers, on the one hand, and the indigenous people, on the other, or within the association itself. Apart from outright conflict, the negative sign within the irrigation association may reflect the failure of the association to organize collective action. Note that conflict might also exist between the spring box users and non-irrigated farm holders and upland farmers.

A negative (-) relationship reflects the presence of conflict between two groups and the need for its resolution. The movement towards a more positive relationship is desirable for watershed management. The absence of a sign in most cells in the matrix indicates the lack of field (ethnographic) research on the relationships of various groups within the watershed. Further research will establish whether the Water District has an unpopular status among groups with potential or apparent conflict with it, such as the indigenous people, upland farmers, irrigation association, private well owners, and urban households. Field studies will also be able to verify whether plantation farms have negative relations with indigenous people, upland farmers, spring box users, irrigation association, water district, and private well owners.

Similarly, studies will determine the apparent effect of upland farmers and spring box users on other groups. A cursory survey of the communities gives the impression that some groups are unaware of the effect of particular groups on their need for environmental services, hence a zero (0) mark. For instance, private well owners and spring box users seem to have no effect on other groups.

Figure 3. Matrix of Social Relations Among Stakeholders

	Indigenous People	Upland farmers	Spring Box Uses	Plantation Farmers	Irrigation Association	Non-irrigated Farms	Water District	Urban Households	Outsiders
1. Indigenous People	+								
2. Upland Farmers	+ -								
3. Spring Box Users		-							
4. Plantation Farmers									
5. Irrigation Association		-			+ -				
6. Non-irrigated Farms			-						
7. Water District	- +	-			-				
8. Private Well Owners							-		
9. Urban Households							+ -		
10. Outsiders	0								

3. A user fee system for watershed management in Nueva Vizcaya and Kidapawan

3.1 Guidelines for user fee development in the two provinces

The following critical steps must be undertaken to institute a user fee system.

First, environmental education is fundamental to the promotion of an environmental user fee system. It is imperative that information on the current state of environmental services is disseminated and that public awareness of the complex natural processes that generate concrete environmental services and the impact of particular human activities on the watershed's regulation functions are heightened. People should know the importance of particular services to specific groups, the provisioning of particular inputs or desirable production conditions by the environment, the effect of the absence of these services on economic production and incomes, and the actions that need to be taken.

Moreover, environmental education and economic literacy are necessary to address the low level of willingness to pay of resource users or the free rider mentality. Note that some farmers do not pay the irrigation service fee while private commercial well owners resist payment for raw water extraction partly because they have gotten accustomed to getting free environmental services. The object of environmental education and economic literacy is to get the commitment or willingness of environmental service users to pay for the services.

Second, the environmental service that is being demanded, as well as the groups demanding it ought to be identified and defined. The demand for particular environmental services may not be apparent immediately because they are products of complex natural, environmental processes that may not be tangibly felt. Demand seems only to be apparent when a shortage of a particular service is experienced, such as inadequate water or irrigation services, excess runoffs, unstable or declining soil quality, river pollution, or fishery depletion. In other words, the poor state of an environmental service underlies its demand. Hence, there is a particular desirable quality of the service that is being demanded.

Third, the demand for environmental services can also be made more apparent if they are represented as more tangible products, such as regular stream flows, water reservoirs, erosion or flood controls, improved/ unpolluted water quality conducive for fish growth, and soil moisture. As potential commodities whose production must be ensured, it is necessary to specify the activities that are required in the production of environmental services. These activities, moreover, must not only be conceptualized. They must also be organized and implemented as an arrangement, technology, project, or contract. For instance, a watershed protection contract entails a set of the best land resource use and management practices while an arrangement for soil and water quality improvement consists of reforestation projects, upland farm practices, land techniques, river protection and monitoring, and waste disposal methods.

The set of required activities guaranteeing the provision of environmental services are similar to the CAC "standards". They explicitly set the allowable conditions or requirements for the provision of environmental services or the so-called positive externalities. Corollary to these requirements, the disallowable conditions or the activities to be avoided or abated because they can damage the watershed's regulation functions may also be included in the arrangement or contract.

The explicit enumeration of the desirable requirement activities and those to be avoided serves as a basis to define the terms, rights and responsibilities of the parties involved, and the mode of compensation. Upland or upstream providers are compensated or rewarded when they meet or exceed the (minimum) standards for land use. If they do not meet the standards nor provide the inputs for environmental service production, then

support must be given in the form of extension services, technical assistance, and maybe even subsidies under established priority conditions.

Fourth, the state of the environment and the country's level of knowledge with regards to the generation of environmental services determine the required activities or standards that must be established. Given the extent of environmental degradation in the country, the arrangements and projects that must be promoted must be inspired by a more developed science. Specifically, there is a need to develop the science and practice of improving local climate conditions, mitigating the damaging effects of natural disturbances, and restoring and enhancing nature's productive capacity. The successful experiments in soil quality and water yield improvement and conservation, agro-forestry, local climate changes from vegetation changes, reforestation for land stability, water generation, flood and wind protection, and other measures must be replicated and improved.

Fifth, given the absence of a market or the natural coordination of providers and demanders of environmental services, a third party is needed to undertake the following functions in the establishment of a user fee system for watershed services. The third party would be responsible for identifying, meeting, and securing commitments or willingness to pay on the part of demanders of environmental services. As noted earlier, so long as the conditions of non-excludability and non-rivalry hold, there would be no incentive on the part of individual consumers of services to pay for the benefits unless they come as a group to an agreement that as beneficiaries they would willingly pay for the environmental services they use. It is critical to get the commitment of key beneficiaries in the river basins, such as the National Irrigation Authority, the National Power Corporation, the Water District, Bureau of Tourism, the large plantations, and large city and municipal governments. Public enterprises and government departments are the single most important buyer of watershed services who have a clear interest in maintaining the quality and flow of water.

The third party would also be responsible for identifying the potential local suppliers who would ensure an adequate supply of particular environmental services, drafting the prospective contract or arrangement, and establishing consensus among demanders and suppliers on the proposed arrangement. It is in the proposed arrangement or joint agreement between the consumers and providers of environmental services that the user fee or cost of such services and the rights and duties of each party would be formalized. Before this stage is reached after the above initial organizing tasks, the third party would also have to act as a mediator of conflicts between demanders and suppliers, and among themselves. Conflicts, for instance, in Nueva Vizcaya and North Cotobato between upland farmers and downstream irrigation associations and provincial water works, and among the irrigation association members must be resolved. Before any agreement can be formed, conflict mediation and resolution is necessary.

Another necessary condition is the provision of incentives and funds for investment in order to address the disincentive and under-investment problem that accompany the free-rider problem and absence of property rights. The task of the third party to pool together the financial commitments of key public enterprises and government agencies as seed money for the establishment of an environmental fund is crucial to this objective. Who then can all undertake all the above functions? With its resources, influence at the local level, the provincial government is in the best position to organize the prospective environmental service providers and demanders, serve as mediator, provide and guarantee property rights, solicit seed money for the environmental fund, and provide investment incentives. As the third party, the provincial government is in effect the instrument of co-management.

Appendix

Functions of the Natural Environment

Production Functions	Carrier Functions	Regulatory Functions	Information Functions
Oxygen	Space for human	Protection against harmful cosmic influences	Scientific and educational information
Water	Cultivation, animal husbandry, aquaculture	Regulation of local and global energy balance	Historic information (heritage value)
Food, nutritious drinks	Energy conversion	Chemical composition of the atmosphere	Cultural and artistic information
Genetic and medicinal resources	Recreational and eco-tourism	Local and global climate	Aesthetic, religious, and spiritual
Raw materials (clothing, building, industry)	Nature protection	Prevention of runoffs and floods	
Bio-chemicals, fuel and energy		Water catchments and groundwater recharge	
		Control of soil erosion and sedimentation	
		Topsoil formation and soil fertility maintenance	
		Fixation of solar energy and biomass production	
		Storage and recycling of organic matter/nutrients, human waste	
		Regulation of biological control mechanisms	
		Maintenance of migration and nursery habitats	
		Maintenance of biological, genetic diversity	

Source: de Groot, 1994

Mobilizing a Multi-sector Group for Watershed Management: Iloilo Watershed Initiative

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Let me begin my paper with a picture of what a meeting at the IWMC or Iloilo Watershed Management Council looks like.

> *The meeting of the Iloilo Watershed Management Council last month was kind of emotional. There were visitors from the Iloilo Flood Control project but such did not dampen the feelings brought by an unfinished agenda of the first quarter IWMC meeting. The agenda was the membership of Iloilo City in the council which has been declared by the provincial legal office as a legal infirmity.*
>
> *A representative from Iloilo City (its CENRO) insisted that the membership of Iloilo City in the council could not deter the functioning of the Council. In fact, it can even enhance coordination. The chairperson of the technical working group of the council replied that function is not the issue but rather the fact that Iloilo City could not be decreed by the Sanggunihan Panlalawigan to become a council member through its ordinance.*
>
> *A representative from the academe (Central Philippine University) said that Iloilo City has been a member of the Council since it was created. Why take the City away from the Council only now?*
>
> *Another member reminded the body that today's council had evolved from a Task Force to rehabilitate Maasin Watershed which was created by the governor in 1994. The council was the institutional arrangement recommended by the Feasibility Study[1] approved by NEDA to manage the rehabilitation activities. The study had recommended social forestry with the granting of tenure (CBFM) to the occupant; to which, many in the city did not agree. Jumping the gun, the governor then created a Task Force with the purpose of relocating the watershed population. The next governor, however, went into the middle ground and agreed to implement a modified version and called it the "co-existence" strategy. He led the mobilization of the city population with the help of a volunteer NGO, to replant 500 hectares of the watershed. Five hundred thousand pesos was raised. In the year that follows, DENR funded community organizing and initial planting activities from 1992-1994 from its agency fund. DENR applied for a loan to rehabilitate the upper portion of the watershed starting 1995. All these years, Iloilo City representative was there to witness the events but has not contributed a single centavo to the effort. The member added though that recently, the representatives of the City to the Council and Watershed Board have faithfully attended to the activities of both bodies although they have not committed any monetary contribution to the council. The City has also followed all resolutions of the Board and even sponsored activities or hosted meetings as requested. The City is also planning to put up its own Water program.*
>
> *The chair of the TWG[2] explained that the presence of Iloilo City will not be lost because the City is a member of the Tigum-Aganan Watershed Management Board[3]. Iloilo City is more effective and is needed in the Tigum Aganan Board where it belongs, rather than at the Council level as it will have no business in the other watersheds of the province.*

[1] Feasibility Study for the Rehabilitation of Maasin Watershed was prepared by Kahublagan Sang Panimalay Foundation. Iloilo City. 1992.

[2] Technical Working Group of the Iloilo Watershed Management Council is composed of representatives from national agencies such as the DENR, NIA, DPWH, DA, DAR, NGO and academe volunteers.

[3] One of the 3 watershed boards in the province where Iloilo City is a member of. The Tigum and Aganan rivers join as Jaro river, and pas ses through 22 barangays of the city. The same river is responsible for its flood. Tigum river is also tapped by the Metro Iloilo Water District as source of drinking water to form part of its supply for the 30% of the city's residents.

To this argument, another representative from the City, the Executive Assistant of the City Mayor, reasoned out that Iloilo City, being the capital of the province and being its economic center, will have a stake in all the watersheds of the province.

Another member, taking the view of the river basin or the watershed approach, disagreed.

The matter was resolved when the chair (representative of the governor) said that the legal office will be consulted on how to clear the council with legal infirmities and what legal instrument to be used to consider the wish of the majority of the members of the Council.

The Iloilo Watershed Initiative.

Mobilizing the IWMC, a multi-sector council in Iloilo province, has a history of 13 years. It started with a realization that the reserved watershed for domestic use is being farmed and is without trees[4]. At that time, the community debated as to what would be the best way to reforest the upland watershed. The debate was carried on in civic club meetings, development council assemblies, schools, local news and in kiosks and bars. As the watershed fever drowned the city discussions, the people in the upland, laid back and watched. There was an interesting recommendation approved by the Regional Development Council VI to adopt a social forestry scheme in rehabilitating the watershed but such formulation is not within the Forestry Law. In the end, the DENR's plan was followed and funded and a Community Based Forest Management Agreement was awarded at the end of the project (1995 to 2003). Some upland people were benefited by the employer-employee relationship with the project but the rest are wary and are waiting for the outcome, expecting a grim one. In fact, on man, told a member of a study team doing a field visit that he does not anymore believe that when you plant trees you will have water because the experience in Maasin revealed that after the farms were deserted and trees were planted in stead, the opposite happened during the last two summers.

Looking back through all the years is a realization that mobilization of a multi-tiered, multi-stake, and multi-sectoral Council was not planned and was not purposive at all. The Council has evolved slowly to its present state as a spontaneous response to problems, issues, and concerns met along the way as a group of concerned citizens watched how the power of consultation was changed by a national policy.

To analyze how the multi-sector management structure of the watershed came into being, a five point analytical framework is proposed. These points are: (a) scale and scope (b) structure, (c) governance (d) functioning, and (e) upstream-downstream interaction.

1. Scale and Scope.

The multi-setor group was created following the watershed approach to managing catchments as provided for in DAO 2000-01. Catchments are scaled according to DENR's definition as follows:

River basin	Over 1,000 km^2	Inter-regional
Large watershed	500-1,000	Regional, inter provincial
Medium watershed	100 – 500	Provincial
Small watershed	10-100	Provincial/ municipal
Micro watershed	Under 10 km^2	Municipal/barangay

[4] The 1992 Feasibility Study reported that only 7% of the forest cover of the protected watershed was left.

The scale or the size of the watershed is an important element in mobilizing a multi-sector group because it defines the span of control, the extent of influence and the area of operation of the multi-sector group. In the case of Iloilo, a medium sized watershed was chosen, or rather became the experimental base. This is the 120 hectare-watershed of the rivers of Tigum and Aganan. These are the two big rivers that meet as Jaro River before it enters Iloilo City. The creation of this planning unit was not a conscious effort. The choice was triggered by a string of events that brought concerns over the future of Maasin Watershed.

One was the fact that the feasibility plan approved by the Regional Development passing through its several committees was not implemented. The community based reforestation with agro-forestry approved by the RDC was changed by DENR to a plantation of fruit trees and exotic species. The established rice farms were removed and planted with trees. Another event is that the PAMB[5] that was created was not operationalized. Thirdly, the project board that was supposed to oversee the DENR scheme of reforestation was not established. The NGO facilitating the process did not have a venue to air complaints and concerns particularly those affecting the upland people. Letters were written but they were not responded to. It was very clear that bureaucracy has a way of thwarting people's aspirations as manifested in study consultations. It was also clear to the facilitators that the upland communities have no voice in the development effort. There are consultations but the people could not make informed decisions because of lack of access to information and there is no open venue for airing concerns. If the NGO is not able to have access to these, the faceless and unorganized upland folks will surely have less.

Mobilizing a larger watershed that will include the Maasin watershed, and will subject the latter to management monitoring and evaluation was the underlying motive. The move was thought to provide answers to the problem of lack of venue to address issues. The lesson for mobilizing a multi-sector group was a felt need that could move mountains.

Another trigger was the lack of funds for the NGO to reach their partners in the upland, as they used to do when they were funded for community organizing contract by DENR. To reach the mountain folks without spending much, a radio program was thought of. The response to the radio program was encouraging as it reached the No. 1 and No. 2 ratings in the AM and FM bands, respectively. The topics discussed in the radio became the scope of the watershed initiative in the Tigum-Aganan Watershed. These included not only reforestation in the watershed but also the quarrying problem, ground water mining, flooding, and the conflict between domestic and irrigation use of the rivers. People issues discussed include health, waste management, economics and quality of life, etc. The radio program also pushed the volunteers to study more about watershed, water, land, people and their interrelationship. New learning such as "plantation is the enemy of the watershed" was analyzed and broadcast and people responded with a big surprise.

The lesson is, simple minded volunteers can create a better curriculum and a more relevant syllabus when problems are expressed and listened to.

Challenges. It took more than two years to make the 7 municipalities, one city, 1 university, 1 NGO, 1 business association, and a people's organization to commit to supporting the watershed Board. Among the last to sign the Memorandum of agreement were the Metro Iloilo Water District, the City of Iloilo and KAPAWA, the organized PO at the Maasin Watershed. It is interesting to note that the beneficiaries of the effort were the last to say yes to the initiative. The political dimension within the bureaucracy of a quasi business organization, of a local government and a created organization of a national agency is one reason for the slow adoption of the new paradigm of the watershed. In fact, up to today, many members would still refer to the watershed as that forest in the mountains.

[5] Protected Area Management Board of Maasin Watershed.

For the LGUs there is a careful treading on the so called "turf of DENR." The usual reason is that they do not have the technical capability to address watershed issues. The unwillingness to devolve powers of huge national agencies could hide in the cloak of technical capability. Knowledge, seen as a monopoly of one encourages low self-confidence on the other. The issue, however, is in the utilization of knowledge by a community, which is only possible when that knowledge is integrated into its culture. It is in this context that a multi-sector group is most valuable. The group becomes a seat of local culture that could cushion, sieve, and refine new knowledge, technical or managerial, consciously or otherwise before it is accepted. However, will the multi-sector group really speak up its conscience or will it play along with politics and economic gains? Perhaps it will, but that same inelasticity that brought about a slow formation will deter the force of the counter factors.

2. Structure.

The figure next page depicts the structure of the multi-tiered multi-stakeholder group in Iloilo watersheds. The Iloilo Watershed Management Council (IWMC) governs the watershed boards that manage their respective watersheds in the province. In Iloilo province, several watershed boards were organized, namely: The Tigum-Aganan Watershed Management Board, the Magapa-Suage River Council, the Sibalom-Baguingin Watershed, and the upcoming Barotac Nuevo rivers watershed.[6] These two major structures are supported by municipal structures and sets of responsibilities shown in a matrix below:

Area	Managing Body	Responsibility
Regional	Western Visayas Water Committee[a]	Monitoring and evaluation of water programs, policy advocacy, information dissemination and supports creation of multi-sector watershed mgt groups in the region.
Provincial	Iloilo Watershed Management Council	Policies, funds, actuation, networking.
Watershed	Watershed Management Board	Planning unit, planning, actuation, technical applications, decision making, programming, watershed monitoring and evaluation
Municipal	Municipal Watershed Council or the watershed core group[b]	Implementation, participation in planning, Consolidation, facilitating technical services and information to barangay
Barangay	Barangay Information Center	Provides information to people's initiatives, whether individual or group. Conducts community mapping and Water planning exercises.
Households or the neighborhood	People's Initiative	Participates in community mapping, water planning. Accesses information, Demands technical services. Decides and initiates action.

[a]Created last June 5, 2003 under the Regional Sustainable Development Council. Still to be endorsed to the Regional Development Council.

[b]The core group is used for informal steering groups in municipalities that have not yet legalized its council.

Legal basis. The IWMC was created by Provincial Ordinance number 2000-041on October 2, 2000 although the group has been meeting as a council for Tigum Aganan since 2000. The Ordinance provided for the creation of watershed bodies where operationalization of policies will take place. The council was implemented by Executive Order No. 260 s. 2001 signed on October 17, 2001 by Governor Niel Tupas.

[6] IWMC, with its partner NGO, the Kahublagan Sang Panimalay Foundation, continues to implement the training on Community Based Integrated Watershed Management for the other watersheds.

Composition. The IWMC has 16 members, namely: the Sanggunihang Panlalawigan Committee on Environment of the province of Iloilo, League of municipalities, City of Iloilo, SP committee on environment, City of Iloilo, National Irrigation Authority, Philippine Information Agency, Metro Iloilo Water District, DPWH, DAR, DECS, NEDA, PNP, Iloilo Business Club, Kahublagan Sang Panimalay Foundation and KAPAWA-Maasin. A proposal to reconstitute the Council to clean it of its legal infirmities is with the legal office of the province. The Watershed Boards, on the other hand, are composed of municipalities within the boundary of the watershed plus academe members, irrigators' association, water district or water association, business groups, people's organizations, and river quarry association, non-government organizations. As the internal rules and regulations are improved, there is a line of thinking at the Watershed Board to expand the membership and make it into an assembly of stakeholders electing an executive board.

Staffing. The office serving as the secretariat of IWMC in 2000 and 2001 was the PENRO-LGU of Iloilo province. With the new governor and the potential conflict of some staff with the PENRO office, the secretariat was transferred to the office of the provincial administrator. The source of technical advice to IWMC and its watershed boards is the Technical Working Group composed of DENR, NIA, DPWH, *Kahublagan*, and other relevant agencies. The Watershed Board on the other hand, is being served by the PENRO-LGU. At present though, the NGO, *Kahublagan* shares the secretariat task through its project, Hydrosolidarity.

Challenges. Will the LCEs be continuously interested? What happened to the next round of LCEs, what is the basis of continuity. Will the structure just become a shell without substance if the LCEs are not interested? The provincial LCE has changed 3 times during the duration of the project. The first was not supportive. The second was a hands-on manager. The third has not attended any Council meeting where he is the chair. Yet, it is with the last governor that the executive order was signed and a regular meeting of the IWMC was held and regular activities initiated by the previous administration were followed. All communications from meetings to attendance in training programs were signed by the Chair of the IWMC who is the governor of the province.

The structure has survived the changes at the provincial level. The strength of the lower portion of the structure rests on a critical mass of followers of an aware population doing environmental initiatives on their own.

3. Governance.

Authority. The authority of the Watershed Boards to govern rests on the mandate of IWMC and the inherent functions of LGUs. The watershed is governed by the resolutions of the IWMC as the policy making body and by the decisions of the watershed boards. The Tigum Aganan Watershed Board has its Watershed plan for 2003 and such is being reviewed and enhanced by a team of consultants for the Flood project of Iloilo. The Magapa Suage Board has its own action plan. Recently it has published a textbook on watershed management adopted by the DECS.

Regulatory power. The regulatory power of the Watershed Board rests on the agreed resolutions which are implemented by the member municipalities. An office staff called Watershed Point Person of each municipality, comprise the Technical Working Group for the Board. This TWG-Board works closely with the TWG-IWMC. The Point Person also links the Watershed Board with the Municipal Watershed Council. There has not been a case yet that a resolution was not unanimous. A collegial body of LCEs, politicians at that, has a way of resolving conflicts in understanding and action through consensus and that is by including in the resolution the exemptions to the general action.

Aside from the top down mode of regulation, the people's initiatives, encouraged by a continuing education program, could initiate compliance from their own groups and with a resolution at the barangay level. This latter concept of regulation is quite nebulous considering the voluntary nature of the initiatives, But when such is

clarified, it is the more effective one. For example, apart from the encouragement of the Departrment of Agriculture and its training, the NGO community has pushed well for the adoption of IPM and organic rice and vegetable farming. This movement took a strong hold as the radio program broadcasts the health impact of chemicals carried by water. Such movement was not even formalized by a decree or a resolution at the municipal or provincial level.

Another realization borne out of experience and information that is more powerful than regulatory measures is the planting of trees, and the right kind of trees. The IEC of voluntary organizations and government agencies to plant trees, especially with free seedlings distributed by DENR encouraged people to plant. In the course of time, however, people have realized that it is not only a matter of planting trees but more importantly the choice of species. Today, one would hear from many quarters, although said in a hushed manner, of the "failure" at the Maasin watershed because the trees caused the severe lack of water at the Tigum River compared with the other El Nino events in the past. Such is only a perception and no data have been disseminated whether such is true or not. The Sibalom River Board in one of its earlier meetings vowed not to follow the example of Maasin watershed, i.e., planting gmelina and mahogany trees, plantation style in their watersheds even if theirs are not declared reserved. People now prefer trees on farms and not in plantations.

The Metro Iloilo Water District (MIWD) has been complaining as well that sedimentation drastically increased in 2002 and 2003 even with the claim that most of the reserved area has been planted with trees. There is only a suspicion that the abandoned farms with broken farm bunds for soil protection, (as they were planted with trees), have exacerbated erosion.

In the latter case, i.e., the MIWD experience, the regulatory power of a national agency, national policies preventing agricultural production inside a reserved watershed, may have impact on the water production, not mentioning the impact on people's income, livelihood and survival.

Decision making. The multi-sector board is seen to provide a broad local community perspective. It is a potential vehicle for the surfacing of local knowledge on land and culture of the natives. These are not seen by policy statements found in executive orders or Republic Acts as they are meant to be general in nature. It is the responsibility of the middle line executives to interpret and adapt the law in a fashion that will not bring more problems to the community.

In the case of the Iloilo initiative, the Iloilo community struggled against the interpretation of national policies by middle line executives. The approval of the feasibility study recommendations of the Maasin Watershed, for example, as discussed and understood by the locals, did not change the interpretation of national policies. The decision was still brought from the top. If there was a multi-sector body at that time, the power to negotiate could have been used. But there was no entity representing the local minds and local culture. The regional development council was not an effective venue to resolve the issue or did not even attempt to resolve the issue at that time. While the RDC is a multi-sector body, its power emanates from the line executives which are mandated to implement agency orders as well. On the other hand, a multi-sector body under the devolved local government code has a separate power source. Through the political process, people's voices are heard.

Citizens' literacy. The crux of the matter in this business of community mobilization is the literacy of the decision makers and the participants to the decision making process. The state of watershed literacy is the substance and the obstacle to an effective multi-sector council. A multi-sector body, given powers by the devolution could be dangerous without knowledge and information. This is the usual reason for not delegating the authority to functionaries in the local government. Everybody says IEC is important. Funds are spent for sophisticated IEC (Information, Education, Communication). The outcome, however, is elusive. Where does the magic lie? Is it in the technique or in the trust and belief in people and in the process of education?

The Iloilo province IEC is a simple 30-minute program over the radio. The simple message it broadcasts is that education does not happen when there is no action.

Scientific data and information dissemination Another dimension of watershed management structure is the availability of scientific data for understanding, managing and monitoring the health of the watershed. The TWG-IWMC has the technical people from DENR, NIA, DPWH, DOH, DA, etc to support its interest and DOST is available for consultation. Reading materials are available from international community as the NGO member participates in international fora like the World Water Forum, the Stockholm International Water Institute Conferences, membership at the Global Water Partnership and the International Rainwater Catchment Systems Association. The present Flood Project of Iloilo has a component to study sedimentation and review the watershed management plan of Tigum Aganan Watershed Management Board. Experts' scientific input will enhance the plan of the Board.

4. Functioning.

The goal of IWMC is

> To oversee the implementation of an Integrated Watershed Management Strategy in the Province of Iloilo under an equitable, sustainable, multiple-use, demand-driven and participatory development.

Functions are:

1. Facilitate the formulation, integration and adoption of a Comprehensive Management and Development Plan covering all watersheds in the province.
2. Oversee and monitor development activities, programs and projects concerning the conservation, development, protection, rehabilitation of watersheds in the province.
3. Provide a legal framework to rationalize watershed management in the province and provide legislative support for watershed management programs in terms of executive orders, ordinances and resolutions.
4. Generate revenues and undertake fund-raising activities in support of the operations of the Council and the projects and activities it may undertake, and assist other concerned local government units in developing and marketing investment packages for watershed development and management.
5. Obtain technical and logistical assistance from national government agencies, international organizations, and the academe for the implementation of the Integrated Watershed Development Plan.
6. Supervise the activities of a Provincial Technical Working Group on Watershed Management.
7. Assist in the creation and establishment of Local Watershed Management Council in identified watershed planning units in the Province of Iloilo.
8. Reconcile conflicts between and among watershed stakeholders which cannot be settled within the Local Watershed Management Councils.

The framework plan of the Tigum-Aganan Watershed Management Board consists of the following:

> Vision Statement
>
> A habitable and productive Tigum-Aganan Watershed sustained and protected by well informed LGUs' and empowered communities working in harmony towards an improved quality of life.

Mission Statement

We commit to work together, develop our capabilities, pool resources, effect policies, network and advocate initiatives for watershed protection, rehabilitation and management.

Objectives:

1. To protect the forest and to increase vegetative cover. (Forest)
2. To promote and practice environment friendly technology in agriculture, conserve water and soil, and promote "food for health" of the people. (Agri-forest)
3. To protect the river system through quality water monitoring by the communities.
4. To promote continuous education, information and dissemination that translates into action.
5. To improve access to minimum basic needs.
6. To draw and promote alternative livelihood activities for communities.

Planning Process. The planning process has been iterative until the Watershed Management Plan for Tigum Aganan Watershed has been approved by the Board. To capture the planning process, the following steps are included in the CB-IWM training program (Community-based Integrated Watershed Management).

1. Area delineation
2. Establish institutional mechanism
3. Watershed Framework Plan
    a. Vision-Mission-Objectives
    b. Impact indicators
4. Watershed Characterization
    a. Barangay community mapping
    b. Barangay water planning
5. Strategic planning
    a. Consolidation of community maps
    b. SWOT exercise
    c. Consolidation of water plans
    d. Identification of the central strategy and programs
6. Integration of the Watershed planned activities with the municipal Annual Investment Plan and Annual Development Plan
7. Monitoring and Evaluation
8. Information Education Communication

Implementation. Because the Annual Investment Plan and the Annual Development Plan of the municipality is integrated into the Watershed Management plan or vice versa, the concerns of the watershed are actually included in the regular programs of the municipality. Some activities are included in the agency plans and implemented by the different agencies. The administrative functions are facilitated by the secretariat. Monitoring the watershed has not yet been installed and the institutional arrangement for such is not yet determined.

Leadership. The IWMC, as already mentioned, has been tested by the 3 governors with 3 different leadership styles. It is felt that as long as the structure is old and mature and the players are well informed on the significance of their work and the current issues that beset their watershed, a leader will respond. It is an inherent functioning of a group or a community to evolve an appropriate leader. If a leader is imposed by an inappropriate system, like political or business interest, mature and aware participants will use whatever is helpful but peer leadership will take over either in overt or covert manner. A community with common stake is like an organism that will swim for

survival. The advantage of the watershed approach is that the common stake is magnified and is presented to the stakeholder in a clear and fashion. The experience of that common stake is real to the players that they could not deny it. And so the messages – "we all live inside a watershed." "Know your ecological address and protect yourself." "There is the good, the bad, and the ugly. There is the good and sustainable watershed. There is the bad and destroyed watershed. What is ugly is that we do not know in which one we live."

Accountability. The function of accountability is one weak aspect of the institutional arrangement in the Iloilo Watershed Initiative. There were suggestions to put a penal clause in the ordinance that will be automatic if the council members will not properly discharge their duties. The suggestion did not gain acceptance yet. This is still an unfinished agenda that will be hopefully addressed soon.

Funds. Upon the creation of the IWMC, the ordinance provided a P1 million support to the council. The fund, however, has not been released. Small amounts were set aside for activities like celebrations, meetings, assemblies or people's congress. The NGO partner has some funds for training and secretariat work. The municipalities on the other hand, fund their Watershed Point Persons and councils. They also implement watershed activities with their local fund.

It was hoped that the Metro Iloilo Water District would fund planned watershed activities. MIWD has a regular program maintaining 400 hectares in the watershed after the DENR and the Task Force took over the management of the watershed. Prior to 1994, the MIWD has a franchise to use the water resource of the watershed after it has been declared as a reserved watershed in 1923. Through the years however, the DENR did not meddle on the management of the area. The Water District, however, was not able to successfully protect the whole 6, 150 hectares from intruders. While there are no housing structures inside the watershed, except in one small area at the foot of the Mt Inaman. The majority of the 10,000 population (1992 data) live by the ridge and outside the delineated area but they till farms inside the watershed. The situation has been managed until 1989 when the study pointed out the fact of the increasing water trucking business in the city as only 30% of the population is served by the water district.

Using the result of the study, MIWD constructed bill boards across the city to make the people aware that by year 2000, the Tigum river will not have enough water even for drinking. MIWD was one of the strongest allies of the Task Force from 1992 until 2002. When contributions from the Iloilo citizens came in streak, MIWD committed P1 million and gave the funds to the Maasin LGU which at that time, was the field implementer of the activities of the Task Force, now the Council. At the end of the year, MIWD was not happy with how the money was spent. In the next year, MIWD gave another P1 M to DENR for the rehabilitation of the watershed. Again, it complained that DENR did not follow the proposed expense items in the budget. In the next year, MIWD again proposed to the NGO , Kahublagan sang Panimalay to handle the funds. The NGO suggested instead giving the money to the Tigum Aganan Watershed Management Board or the Iloilo Watershed Management Council, thinking that such is an opportunity to strengthen the structures. With the LGU experience of MIWD, it now refused to give its fund earmarked for the rehabilitation of the watershed. For the meantime, MIWD experienced heavy sedimentation in its processed water. It also carried the brunt of blame when in the summer of 2001, when no water flowed down the damn towards the lower portion of the Tigum river.

Realizing the predicament of MIWD which is willing to support the watershed effort but has nobody to trust, Kahublagan, together with the TWG-IWMC prepared a proposal for project RUPES or Rewarding the Upland Poor for the Environmental Services they Render. The purpose of the project is to study and implement instruments and mechanisms to allow equitable remuneration for the services of the communities in the upland in protecting the watershed.

End view.

The paper has discussed the scale and scope of work of watershed management. The structure where authority emanates and responsibilities are accounted for was presented. Governance and functioning of new initiative were discussed as openly as possible. Yet it is clear that the Iloilo Watershed Initiative has a lot of things to do or to evolve.

The fact remains, however, that there is seemingly an endless list of exciting issues that grabs the attention and interests of members, facilitators, the media and the public in general. The process has begun. It is in the expectation of things to happen rather than the end view that spells life. Life has indeed begun.

THE INTEGRATED WATER RESOURCES ALLIANCE [IWRA]:
Experience and lessons learned in the Philippines

By: Atty. Gil-Fernando C. Cruz,
Executive Director, League of Cities of the Philippines

We recognize that one of the most critical and immediate challenges of urbanization are inadequate water supply and sanitation. In most cities, there is no management of available water supply between households, the private; sector (manufacturers and service providers), and agricultural users within shared watersheds. Wastewater flows untreated into clogged sewers, canals, rivers and coastal areas, which in turn cause flooding, disease and damage to coastal and marine resources.

We believe that no less than an integrated water resources alliance is necessary if we have "to address these urbanization concerns in a more holistic and sustainable manner. The Integrated Water Resources Alliance (IWRA) is:

An initiative:

Two Philippine city mayors attending the mayors' Asia pacific environment summit-while separately filling up their commitment forms-uniformly committed to institute measures and mechanisms by which to plan and manage their water and watershed resources.

An approach:

IWRA demonstrates an innovative approach to integrated water resource management, planning and alliance building that focuses on a participatory process deemed to help the poor directly by identifying measures they can take to protect and expand their asset base. It adopts an inclusive and participatory process that engages economic interests in urban, industrial, agricultural, and tourism sectors and focuses on the needs of the poor.

An alliance:

As the name suggests, IWRA is an alliance built upon the commitment of the partners to pursue integrated water and watershed resource planning and management. In fact, our very purpose in being with you today is to pursue the possibility of expanding this partnership through a presentation of the initial experiences of the project, its progress toward furthering the Naga and Iloilo City mayors' commitments toward improved water resource management from an integrated perspective, to share lessons learned, and to provide the forum through which we can raise and manage water resource issues from a local government perspective. Specifically, the alliance seeks to make three contributions to this workshop: (1.) share the Naga and Iloilo cities' experience as a model for other LGUs beginning to address co-management of natural resources; (2) outline the utility of the IWRA tools to address improved management from an eco-governance point of view-particularly on how to implement activities that improve the flow of information and coordination between local and national government entities, and the development and maintenance of information compendiums or workbooks to document current projects, data, and trends; and (3) summarize the implications for LGUs of the proposed Clean Water Act and highlight areas of concern over compliance identified by Naga and Iloilo cities. This would serve as an introduction for further discussion with LGUs at the workshop exploring ways to promote effective stakeholder dialogue and input into the Clean Water Act.

A good governance practice:

From the vantage point of the LCP, we look at IWRA as consummating the good urban governance norms of sustainability, security and civic engagement and responsible citizenship.

A poverty reduction measure:

We likewise adopt IWRA as a poverty reduction strategy. The poor depend heavily on a range of environmental 'goods' for their livelihoods, including land, potable water, water for agriculture, fisheries and forest products. They suffer disproportionately when environmental conditions deteriorate or their access to these resources is limited or denied. Improved governance of key resources, like water, is needed to establish a more effective and 'pro poor' policy and institutional environment for action. The participatory approaches to be used will help the poor directly by identifying measures they can take to protect and expand their asset base. Growth is a necessary but not sufficient condition for poverty reduction. The activity will enhance the quality and sustainability of growth through better water resources management and reducing impacts on the environment.

IWRA aims to demonstrate a participatory planning approach to improve management of water among households, the private sector, watershed dwellers, and agricultural, users.
By this, we hope to strengthen the cities' integrated water resources planning and management and develop an alliance or partnership for furthering integrated water resources management approaches in these and other cities.

Our initial demonstration sites are Naga and Iloilo cities. Later today, both cities will present updates on project implementation in their respective sites. Suffice it to say, however, Naga City has embarked on the development of Metro Naga Water Resources Council, while Iloilo City seeks to focus on integrated basin wide water and water resources planning and management. Nonetheless, you will learn later from the cities themselves that they have decided to institutionalize the water resources council to serve as the water quality management area governing boards in their respective cities, even before the passage of the Clean Water Bill.

The League of Cities of the Philippines (LCP), of which Iloilo City and Naga City are members, provides local assistance, particularly for developing a water resources alliance network in the Philippines.

PADCO, Inc. provides technical assistance to the demonstration cities for integrated planning and defining the process and functions of the water resources council and will work with the LCP on developing a water resources alliance involving appropriate local and us institutions.

The International Council for Local Environmental Initiatives (ICLEI) extends expert assistance and support to both the LCP and the two pilot sites.

The US Agency for International Development (USAID) continues to provide funding and technical support to the project.

As a prelude to project implementation, a work planning session among the partners was held in manila to map out the implementation stages for the duration of the project.

Surveys, complemented with actual site visits, were then conducted between December 2002 and April 2003-wherein workshops on integrated water resource management were held, stakeholders were identified, and who were then made to assess uses of water and identify issues and concerns thereon.

Finally, in May 2003, Stakeholders' Workshops were conducted in which stakeholders described their activities and mapped them.

Briefly, the stakeholders' workshops reviewed activities in the four major areas of flooding, pollution, watershed degradation, and water supply.

The workshops, likewise, validated and corrected information on current activities, identified gaps as well as actions needed to address these gaps, and-for each action point-identified who would do what and when, not to mention the resources needed to fulfill the action point.

The cities then developed and adopted their city action plans. They also crafted consolidated and organized information and maps on current and proposed projects that would feed into the workbooks. In the process, the cities defined clear visions for moving forward with IWRA and made the commitment to continue to meet and share information, raise issues, and coordinate and plan future actions. They also agreed to use the workbook as a tool.

The Metro Naga and Metro Iloilo development councils would facilitate the entire process. They project that these councils could serve as starting points for the clean water act requirement to establish water quality management area governing boards.

In sum, both cities agreed on the critical next steps as projected on the screen.

Ultimately, the beneficiaries of the project will be the citizens of the implementing local government units. The use of water and watershed resources in an environmentally sound and socially responsible manner will best stimulate sustainable growth and help the poor. Improved governance of key resources, like water, is needed to establish a more effective and 'pro poor' policy and institutional environment for action. The participatory approaches will help the poor directly by identifying measures they can take to protect and expand their asset base. Growth is a necessary but not sufficient condition for poverty reduction. The activity will enhance the quality and sustainability of growth through better water resources management and reducing impacts on the environment.

With these words, we convey our appreciation to you for giving us this opportunity to present our humble contribution to this effort of preserving, managing and sustaining our valuable asset: water.